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FPM Technology Update

Issue No. 91-2

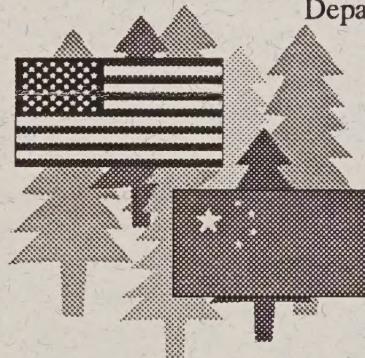
December 1991



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U.S. and China Undertake Joint Forest Health Venture

The USDA Forest Service (FS) and the People's Republic of China Ministry of Forestry (MOF) share similar objectives with regard to maintaining the health of their forests, including minimizing the effects of forest insects and disease organisms. With the MOF and the FS each having unique knowledge of forest health issues, both feel that an exchange of personnel and technology would increase their effectiveness of forest health protection efforts. To promote this exchange of information, a "Joint Statement on Forest Health Protection" has been drafted outlining the responsibilities of both organizations and their mutual goals. Areas of common interest include: the technology associated with the application of aerial videography systems; management of conifer bark beetle populations; development of biological control strategies for forest pests; and control of lepidopterous defoliations in high-value forests.



To obtain information on the integrated forest pest

management programs in the People's Republic of China, a delegation of U.S. forest health management specialists spent a month there in May and June of this year. Team members included Kenneth Knauer, Delegation Leader, then Assistant Director, FPM; Douglas Loh, Director, STARR Laboratory,

Department of Range-land Ecology and Management, Texas A&M University; William White, Assistant Director,

FPM, FPM/MAG; and Richard Myhre, Program Manager, Remote Sensing Unit, FPM/MAG. The main objectives of this visit were to: (1) gain an understanding of the current organizational structure and how forest health activities are handled administratively in China; (2) evaluate the current Chinese forest pest situation utilizing U.S. forest health monitoring and evaluation abilities; (3) introduce integrated forest health management strategies to address the needs of the People's Republic of China;

and (4) recommend organizational and administrative enhancements or refinements where appropriate.

In their travels to China, which included stops in Taiwan and Hong Kong, the U.S. forestry specialists visited the Ministry of Forestry and various universities, research centers, forestry bureaus, and forestry farms. The team gained knowledge of Chinese integrated pest management, including parasite-rearing programs; remote sensing capabilities; and modeling efforts.

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For Your Information . . .

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The Forest Pest Management Methods Application Group publishes *FPM Technology Update* semi-annually and distributes it nationally to FPM personnel and others interested in forest pest management. The newsletter seeks to link FPM/MAG with field personnel and inform them of program activities and status, model availability, upcoming models and their release dates, and current related news. We invite your comments and suggestions on how we can keep you informed and better serve you. If you have items of interest or comments, or wish to be added to our mailing list, contact:

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FPM Cooperators



National Forests in Texas Implement Airborne Video System

For the past two years, staff members of the Advanced Technology Program of MAG have been working with National Forests in Texas personnel to implement the airborne video system on Texas forests.

In the summer of 1989, Texas experienced a southern pine beetle outbreak and forest managers, after seeing a presentation by Dick Myhre of MAG's Advanced Technology Program, felt that airborne video could be used to monitor the outbreak.

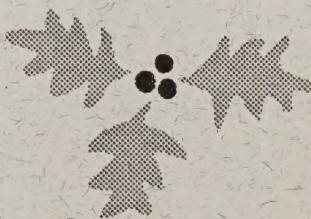
Bruce Silvey, then a timber sale administrator on the Neches Ranger District, attended a video training session with MAG in April 1990. Silvey was trained in airborne operations and video image processing and after returning to Texas, discussed the airborne video system with Forest Supervisor Mike Lannon. Within a few months, various disciplines within the National Forests in Texas contributed to the purchase of the airborne video system.

After the Forests purchased the airborne and image processing

equipment, Silvey and David Oates, Resource Staff Officer for the National Forests in Texas, and their co-workers became trailblazers in putting the system into operation, and developed a users guide and training sessions. During this time, they worked closely with Myhre and Carl Sumpter, also of MAG's Advanced Technology Program.

In addition to detecting southern pine beetle, the National Forests in Texas use the airborne video system to enhance and update maps, inventory watersheds and the National Grasslands, evaluate storm damage, make management decisions about timber stand prescriptions and site preparations, and evaluate regeneration activities.

Both Oates and Silvey also foresee a variety of future uses for airborne video. The various Forest staffs are considering using the system for road inventories and for activities related to law enforcement. Video will be used to plan restoration work on specific treatment areas and may even be used to assist in the development of a recreation plan for the National Forests in Texas. Airborne video might also play a major role in a fire dispatch system that would include a data base of video images. Fire control officers would use the imagery to locate structures and bodies of water when planning firefighting strategies. □



For Your Information . . .

Welcome

Judy Adams has joined the Quantitative Techniques Program (QTP) of MAG as a computer programmer analyst. Judy started her Federal career with the Rocky Mountain Forest and Range Experiment Station in 1975 as a keypunch operator and later was the lead clerk for the publications staff. After seven years and various positions, Judy accepted a position with the Office of Information Resources Management at the National Computer Center at Fort Collins (NCC-FC). While at NCC-FC, she served as assistant to the system's administrator for the Data General, Technical Hotline Service Center, and Unisys Operations Support Staff. Her education includes an A.A.S. in Business Administration and a B.S. in Technical Management.

While with MAG, Judy will support and answer questions for users of the pest model extensions that run with Prognosis, and is the systems administrator for the QTP's Unix workstation.

Eric Smith has joined the MAG Quantitative Techniques Program as a biometrician. Eric came to MAG from Region 5, where he served on the Regional Office Timber Management staff as group leader for budgets, program planning, and data management. Prior to that, Eric was a research forester for Pest Impact and Fire Management modeling projects at the Pacific Southwest Experiment Station. He also has had experience at the North-Central Experiment Station as a computer programmer and on

Region 6 Ranger Districts. Eric earned B.S. (Outdoor Recreation) and M.S. (Forest Management) degrees from Iowa State and a Ph.D. from the University of Minnesota (Forest Economics). With MAG, Eric will lead statistical consulting, analysis, and training efforts and be involved in the construction and modification of pest models. He also will be exploring opportunities to better integrate forest pest information into the forest planning process.

Stephen Williams has accepted a position as a computer specialist with the Systems Development Program of MAG.

Stephen has earned B.S. (Forestry) and M.S. (Forest Planning) degrees, both from Virginia Tech. He also has a B.S. Certificate in Information Systems from Virginia Commonwealth University and has been the Information Resource Manager for the Virginia State Office of the Farmer's Home Administration. In this position, Stephen has been managing all of the computer operations for the state office and 55 field offices. He has experience in UNIX minicomputers and DOS-based systems connected by local area networks (LAN).

Stephen has designed and developed data base applications, and devised training programs to serve a variety of users. He has assisted and supported large-scale statistical surveys for the States of Virginia and New Hampshire, and for the National Agricultural Statistics Service. □

MAG Reorganizes Remote Sensing Program

To improve service to FPM field units and other cooperators in advanced technology development, application, and transfer, MAG has reorganized its Remote Sensing Program and Interagency Laboratory into a new program. The Advanced Technology Program (ATP) provides both the facilities and expertise to demonstrate and evaluate new technologies for field use. ATP personnel will assist field staff in geographic information systems (GIS), remote sensing, image acquisition (both frame photography and videography), global positioning systems (GPS), image analysis and processing, integration of GIS and remote sensing, and data visualization through training, technical assistance, published reports, and manuals.

In addition, ATP offers the opportunity for field personnel to work directly with technical specialists at MAG. Through cooperative projects and short-term details, field personnel can gain experience in many new technologies by working with their own projects and data in a hands-on environment.

Ross Pywell has returned to MAG, and is now manager of the Advanced Technology Program. He is ably assisted by Dick Myhre, remote sensing specialist. Dick is responsible for managing MAG's image acquisition program and for future development of the video camera system. Ross is responsible for overall program management and laboratory activities. □

Advanced Technology Program ...

MAG Delivers Airborne Video System to Users

MAG has developed an airborne video image-acquisition system for fiscal year 1992 to support a variety of aerial survey needs. To simplify the transfer and implementation of this system, a consolidated airborne video system procurement package was developed. The consolidated package ensures that the users of the system have all of the correct components, and that the system will function as it was designed and field tested to do.

The following six Forest Service groups have purchased the airborne video systems:

- Region 2/FPM - Denver, CO

- Region 3/Kaibab National Forest and FPM - Williams, AZ
- Region 4/FPM - Boise, ID
- NE Area/FPM - Durham, NH
- NE Area/FPM - Morgantown, WV
- FPM/MAG - Fort Collins, CO

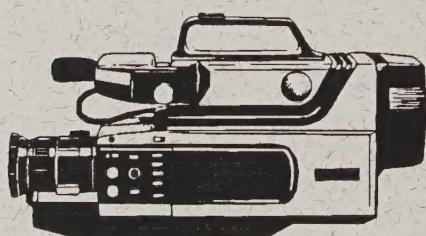
Other groups that purchased systems prior to the consolidated procurement package are:

- NE Area/FPM - St. Paul, MN
- Region 8/National Forests in Texas - Lufkin, TX
- Region 8/FPM - Pineville, LA
- Nationwide Forestry Applications Program - Salt Lake City, UT

For further information on the airborne video system, contact Dick Myhre, (303) 498-1778. □

ATP Assists in Search and Rescue Mission

Two Wyoming Department of Game and Fish biologists and a pilot from Western Air Research were declared missing on October 16 when their aircraft did not return to the Jackson airport on schedule. On October 18, MAG received a request from search organizers for use of its S-VHS video camera system in the search. In response to this request,



MAG sent its camera system and aerial photographer, Barry Russell, to Jackson Hole.

Although the downed aircraft and crew have not been found, both MAG and the Jackson County Sheriff's Department learned a great deal from the experience. After arriving in Jackson, Russell had to install MAG's camera system in an aircraft he had not used previously. Because the aircraft's LORAN system was not compatible with the airborne video equipment, MAG's global positioning system (GPS) unit was used for image coordinates. Two advantages of the camera/GPS system were quickly realized. First, when what appeared to be an aircraft wing was sighted on the video monitor, Russell was able to rewind the tape and give ground coordinates to the pilot. These coordinates

See Search on page 10 □

ATP Uses Remote Sensing, GPS, and GIS for Insect Evaluations After Fire

In July of 1990 the Horsefly Creek fire on the Uncompahgre National Forest occurred in an area that was experiencing high bark beetle populations in ponderosa pine. Norwood District employees contacted the FPM-Gunnison Service Center (GSC) about the fire's effect on prolonging bark beetle activity. Of major concern were stressed trees, specifically scorched trees that might be susceptible to attack and cause the bark beetle situation to worsen.

Two weeks later the ATP staff acquired color infrared photos of the fire area. After considering the size of the area and the limited time and staff available, ATP staff members felt remote sensing, GPS (global positioning system), and GIS (geographic information system) technology could be used to sample a large area in a short period of time. The ATP staff interpreted the photos to distinguish three levels of fire intensity. They used GRASS (GIS software) to create five maps and randomly selected plots for sampling tree diameter, intensity of burn, and the presence or absence of bark beetles and borers. Finally, the staff made a photo mosaic of the fire and adjacent area, and printed maps of the fire intensity levels and a listing of plot coordinates for use in the field.

ATP completed the evaluation in three days, with considerable time saved in locating the plots. The photo mosaic and the fire intensity maps were invaluable aids, and demonstrated the potential for higher accuracy and timesavings using the combined technologies of remote sensing, GPS, and GIS. □

Advanced Technology Program

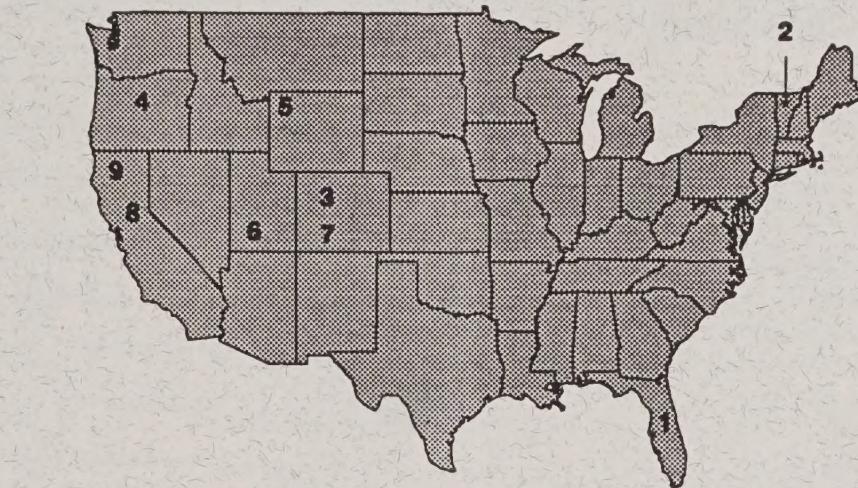
ATP Finishes Aerial Photography and Videography Missions for 1991

The Remote Sensing Acquisition and Aircraft Project (RSAAP), under the leadership of Dick Myhre, remote sensing specialist, is part of MAG's Advanced Technology Program and was involved in a variety of aerial photo and video missions during 1991. The following mission descriptions correspond to the map shown to the right, and numbers indicate the order in which missions were flown.

1. Florida - Airborne video imagery was acquired in June for the U.S. Fish and Wildlife Service through an interagency agreement. The purpose of this cooperative effort with the National Wetland Inventory group at St. Petersburg, FL, was to evaluate the feasibility of using airborne video imagery to monitor wetland changes.

2. Vermont - A joint project was begun among the Northeastern Area FPM office in Durham, NH, the State of Vermont, and MAG to evaluate the feasibility of using airborne video to supplement and enhance Forest Health Monitoring methods. Airborne video and color infrared photos were acquired in July over a variety of plots, including forest health plots, Vermont hardwood survey plots, and spruce/fir survey plots. MAG will interpret and analyze the video images and photos this winter.

3. Colorado - In cooperation with Region 2 FPM, airborne video imagery was acquired to evaluate insecticide treatment



methods (bait and spray) for the control of mountain pine beetle. The mission was flown in late July on the Uncompahgre National Forest.

4. Oregon - At the request of the Ochoco National Forest in Region 6, an aerial photography mission was flown to acquire color infrared photos over a large portion of the forest. The photos are being used to plan strategies and actions for dealing with vast areas of mortality caused by spruce budworm defoliation and Douglas-fir beetle attacks, coupled with five years of drought.

5. Wyoming - As a result of the 1988 Greater Yellowstone Area fires, pest activity has been increasing on the Shoshone National Forest, east of the national park. Scorched and stressed trees in the area are highly susceptible to pests, mainly bark beetles. An aerial photo mission was flown in late July to acquire color infrared photos to map current pest activity and areas of mortality. The photos will be used to develop a data base to monitor potential large-scale insect outbreaks. In addition to the photo mission,

video was acquired of a proposed high-priority timber sale area.

6. Utah - Aerial photos and video images were acquired in early August over four test sites on the Dixie National Forest. The imagery will be used in a data visualization project.

7. Colorado - A pilot test was conducted to evaluate the feasibility of using remote sensing technology linked with a global positioning system (GPS) for forest health monitoring. The objective was to determine the ability to relocate and collect imagery on transect lines with plot points located at regular intervals. Using GPS navigation, photos and video images were acquired on two different flights along an 80-mile transect east of Durango.

8. California - In August a joint developmental mission was conducted with the Nationwide Forestry Applications Program (NFAP) located in Salt Lake City, UT. The purpose of this mission was to install and test a special camera system that has been transferred from NASA to the Forest Service. The Airborne

See Missions on page 10

Quantitative Techniques Program

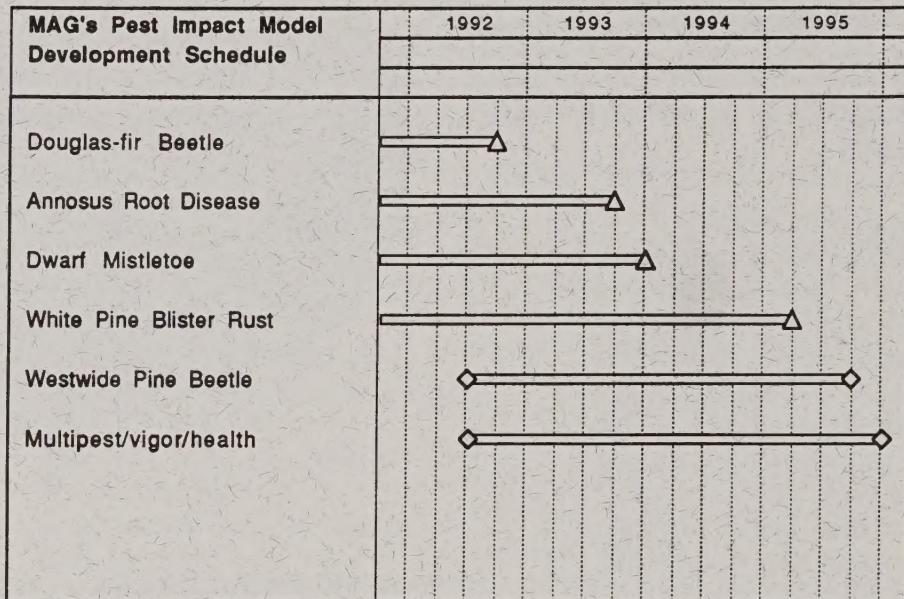
QTP Develops 5-Year Plan for Technology Transfer

The Quantitative Techniques Program of the Methods Application Group developed a 5-year plan to produce, verify, and validate pest impact models, and to transfer the models to forest managers, silviculturists, pest management specialists, and others. The plan, entitled "Forest Pest Models: A Technology Transfer Plan" (Report no. MAG 91-2), reviews the status and availability of pest impact models for nationally significant forest pests. The plan also discusses the tasks involved in the transfer of computer models, proposes FPM's roles in pest impact modeling, and presents a 5-year program for MAG's modeling efforts. The figure to the right shows MAG's pest impact model development schedule. The west-wide beetle and the multipest models are tentatively scheduled and their development will depend on available funding. For more information on pest models, contact Bov Eav, (303) 498-1784.□

Dwarf Mistletoe Model Development Continues

To develop a comprehensive dwarf mistletoe model, participants in the May 1990 dwarf mistletoe model development workshop identified the following eight tasks that must be completed:

- Develop a tree mortality modification model for dwarf mistletoe effects.
- Develop a tree growth modification model for dwarf mistletoe effects.



- Develop a dwarf mistletoe spread and intensification model.
- Develop a model of changes in tree and stand broominess and stand abundance of spiked tops arising from mistletoe infection.
- Modify the existing stand development models to more realistically simulate mistletoe dynamics.
- Link the mistletoe models with existing stand development models.
- Define changes (if necessary) to dwarf mistletoe and stand inventory procedures needed to use the models.
- Develop appropriate user documentation and training for the models.

The first two tasks are accomplished. The resulting growth reduction and mortality functions are integrated into 14 variants of the Prognosis model, covering a wide area in the Western United States. A draft report entitled "Interim Dwarf Mistletoe Impact Modeling

System: Users Guide and Reference Manual" (USDA Forest Service, Forest Pest Management/Methods Application Group. Report No. MAG-91-3, October 1991, 93pp) is available upon request from the Methods Application Group. This report describes the functions and host/pest relationships in the model and the procedures for using the model.

The third task is well underway. A model design workshop was conducted October 1-3, 1991, in Estes Park, CO. Information obtained through this workshop is being used by the contractor, Environmental and Social Systems Analysts Ltd., to design the mistletoe spread and intensification submodel. The model design document is expected in January 1992 and the entire modeling effort is expected to be complete by the end of fiscal year 1993.

For more information on the Dwarf Mistletoe Model, contact Matt Thompson, (303) 498-2305.□

Quantitative Techniques Program

MAG Updates Pest Models for New Version of Prognosis

The Prognosis Stand Growth and Yield Model was updated in June and July to version 6.1, with major changes occurring in how the model simulates the regeneration of trees. Eight variants now run on version 6.1: Blue Mountain, Central Idaho, Eastern Cascades, Eastern Montana, Northern Idaho, SORNEC, Utah, and Wessin. The remaining six Prognosis variants will be upgraded in the near future.

To keep pace with the Prognosis changes, MAG has linked pest models to the version 6.1 variants. Prognosis users can retrieve Prognosis and the pest extensions on the Data General with no change to the previous procedure. The appropriate version (6.0 or 6.1) will be loaded automatically, based on the variant chosen. For questions or problems regarding Prognosis and the pest extensions, contact the Prognosis/pest regional representatives, or Judy Adams at (303) 498-1727. □

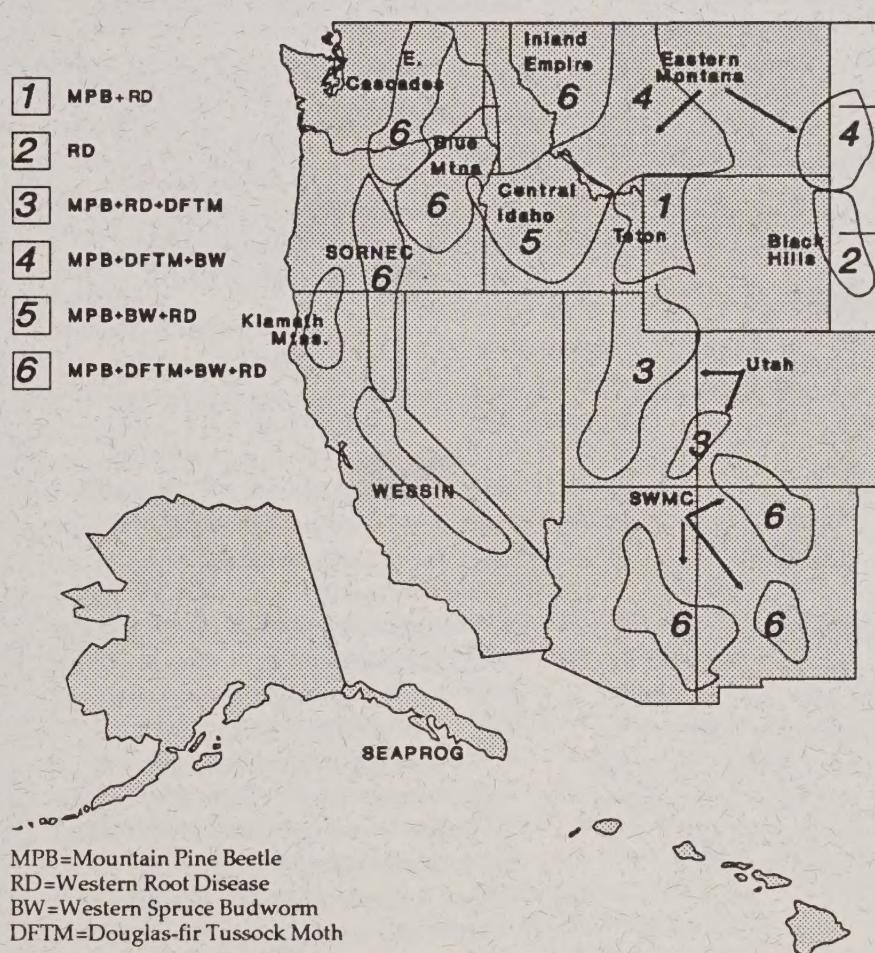
Permanent-Plot Data Base to Aid in Model Development

The western regions continue to produce a system of permanent plots for the development and validation of a variety of pest models in the Western United States. The system includes plots established by FPM as well as non-FPM groups within the Forest Service.

In March of this year, a workshop was held in Missoula to begin development of a data-base

AVAILABILITY OF PROGNOSIS-PEST MODELS

(Revised 08/91)



system of various cataloged permanent-plot systems. The plot systems in the data base will provide high-quality data on individual types of pests, as well as on interactions among pests, and will be shared with research and the National Forest System. The data-base management system currently focuses on dwarf mistletoe, root disease, mountain pine beetle, and western spruce budworm.

Since the March meeting, QTP has compiled a list of data fields required for the data-base system

and formed the relationships among the fields. A review of the list of fields and their relationships was held in Fort Collins in May 1991; additional data needs are still being determined. A project plan has been developed and was sent in October 1991 to the project team for review and approval. QTP also has developed software for Region 3 FPM for use on their field-data recorder for collecting permanent-plot tree data.

For more information on the permanent-plot data base, contact Renee Platz, (303) 498-1754. □

Quantitative Techniques Program

Statistics Training Held in Fort Collins

MAG held a three-day biometrics training session November 5-7, 1991, in Fort Collins. The primary areas covered were sampling theory, forest inventories, the statistical basis of forest growth and pest models, and use of statistical software. The goal of the workshop was to review statistical concepts and to relate these concepts to FPM field work. A variety of speakers from the Washington Office, Rocky Mountain and Intermountain Research Stations, and Colorado State University participated.

Attendees came from every region and the Northeast Area. Interest in this session by field units was high and MAG had more people interested in attending than could be accommodated. Because of this, MAG is tentatively planning to hold a similar session sometime next year. For more information on future training sessions, contact Eric Smith, (303) 498-1845.

QTP Begins Work on West-wide Pine Beetle Model

A model-planning workshop was held June 18-20, 1991, in Fort Collins, CO, to determine the research needs and host-beetle combinations for a new, west-wide pine beetle model. The workshop, facilitated by Environmental and Social Systems Analysts Ltd. (ESSA), brought together researchers, modelers, and forest pest managers to discuss research needs and data analysis tasks necessary to

develop the model. Workshop participants also developed a schedule and plan for the model development. From this workshop, ESSA produced a report entitled "A Model Development Plan for Pine Beetles."

The west-wide pine beetle model is being proposed for Technology Development Project funding for fiscal year 1992. If approved, the project will begin after March of 1992. For additional information, contact Eric Smith at (303) 498-1845.

plans to integrate a complete geographic information system in the near future. Chinese forestry, however, seems to be about five years behind the U.S. in developing a computer-based integrated forest health management system, one area in which the FS could possibly offer some assistance to the MOF.

With the trip to China this year by U.S. forestry specialists kicking off the five-year program between the MOF and the FS, additional activities are currently being considered by both countries. Mr. Yuan Haiying, Deputy Division Chief, Foreign Affairs Division, Department of Foreign Affairs, MOF, will be in Washington, D.C., this month to meet with the USDA/Office of International Cooperation and Development (OICD) to evaluate proposals for FS/MOF exchanges in 1992. Some exchanges under consideration are attendance by MOF specialists at airborne videography evaluations at various locations in the U.S.; FS specialists at the International Congress of Entomology and Ministry of Forestry, Department of Science and Technology and Chinese Academy of Forestry; and both FS forest health specialists and MOF technical specialists at Resource Technology (RT) 92 to be held in Taipei, Taiwan. Mr. Yuan, incidentally, has expressed interest in hosting RT 94 or 96 in Beijing.

Through this forest health joint venture between the Ministry of Forestry in China and the Forest Service in the United States, the specialized knowledge of each organization will be exchanged. By providing this opportunity for joint technology development and application, the forest health capabilities of both organizations will be enhanced.

China continued from page 1

It was discovered by the team that in the area of biological control, the Chinese were technically at the same level as or ahead of U.S. researchers. Also, China excelled in field implementation of research program techniques.

Parasite-rearing programs in China involve testing various species of parasites, preparing host eggs, producing parasites, releasing parasites in the field, and evaluating parasite performance. Not only are China's parasite-rearing programs simple and inexpensive, but have proven to be 80-90% effective in reducing selected forest pests or keeping pests from reaching outbreak numbers.

While aerial photography is being used commercially in China for urban planning, water resource surveys, and vegetation mapping, it is not presently being used for pest management detection and monitoring. China does, however, have a strong interest in someday utilizing airborne videography as a remote sensing tool.

Computer simulation models in integrated pest management are evident at every administrative level in China. And the Chinese have

Systems Development Program

Region 6 Using INFORMS-DG to Produce Environmental Impact Statement

Region 6 continues to use INFORMS-DG (INtegrated FOrest Resource Management System on the Data General) on the La Grande Ranger District on the Wallowa-Whitman National Forest to analyze management alternatives. The alternatives will be presented later this year in the Environmental Impact Statement for the Five Points area.

The draft systems documentation and users guide for INFORMS-DG are both complete and MAG is collecting comments on the documents. MAG will use these comments to refine the system and documentation.

The Butte Ranger District of the Deerlodge National Forest in Region 1 has completed the Lime Kiln Environmental Assessment (EA) with the help of INFORMS-DG. The integrated system architecture allowed several resource models to be used together to simulate proposed alternative actions. Using the INFORMS-DG Visual Impact Model with Prognosis and the mountain pine beetle pest

extension, resource managers were able to produce visual simulations of proposed management alternatives, which were included in the EA as color, computer-generated graphics. These visual simulations depict the immediate post-harvest appearance of the area from critical viewpoints. They also show the simulated future effects of mountain pine beetle damage as influenced by the management activities proposed in the various alternatives.

The Butte Ranger District strongly supports INFORMS-DG and is interested in acquiring the improvements made to the system on the La Grande Ranger District. The Deerlodge National Forest and MAG are investigating the level of interest at the Regional Office in supporting continued implementation and improvement of INFORMS-DG in Region 1. MAG is using the two districts to investigate the feasibility of moving a general-purpose software tool such as INFORMS-DG from site to site, while allowing replacement or modification of the simulation models to reflect local conditions. For more information on INFORMS-DG, contact Dave Roschke, (303) 498-2303.

INFORMS-TX Implemented on Neches Ranger District

The Neches Ranger District in Texas has acquired a Sun workstation and begun using INFORMS-TX, with the assistance of Texas A&M University and the Region 8 Regional Office.

Texas A&M University has worked with Region 8 Management Systems and FPM to integrate resource-simulation models from COMPATS into INFORMS-TX, and to conduct knowledge engineering sessions on the Neches Ranger District. Rulebases from the sessions have been incorporated into INFORMS-TX.

To expand the use of INFORMS-TX beyond Region 8, MAG will install INFORMS-TX on its Sun workstation in 1992, and explore the possibility of a partnership with Region 6 to assess the transfer of INFORMS workstation technology to that Region. Under this partnership, the Pine Ranger District on the Wallowa-Whitman National Forest also would acquire a Sun workstation and INFORMS-TX. Work would proceed at the district and within MAG to test the feasibility of adapting INFORMS technology to meet Region 6 needs, and of using data from the District Production Data Base to drive a decision-support tool such as INFORMS. The Pine Ranger District is participating in the District Production Data Base project, a joint effort among the Regions and the WO to provide the foundation for an integrated Information Management System that will support day-to-day work on ranger districts. For more information on INFORMS-TX, contact Dave Roschke, (303) 498-2303.



Systems Development Program

FPIS To Be Moved to the DG

The Forest Pest Information System (FPIS) is an FPM Washington Office application used to collect information from the regions for the Forest Insect and Disease Conditions Reports. FPIS currently runs on the NCC Unisys using System 2000, but with the removal of the Unisys later this year, FPIS will be moved to ORACLE on the Data General. All existing data already have been converted to the ORACLE data base.

The design of the new FPIS will be compatible with the Forest Service Integrated Information Environment (FS-IIE) definitions, and Oracle's CASE*Dictionary is already being used extensively. FPIS will consist of several data entry screens with all appropriate edit checks, as well as a number of predefined reports. After each annual reporting period, the information in FPIS will be available electronically to the regions for their use. FPIS will be available

for use with calendar year 1991 data, which will be collected in January 1992. For more information on FPIS, contact Chuck Siefke, (303) 498-1761. □

INFORMS Workshop To Be Forum for Technology Transfer

The Systems Development Program has tentatively planned an INFORMS workshop for April 7-9, 1991, in Fort Collins, CO. The purpose of the workshop will be to present the current INFORMS-DG version and the INFORMS prototype developed in collaboration with Region 8. The workshop also will be a forum for technology transfer of the integration techniques used within INFORMS. During the workshop, resource specialists, research scientists, and systems developers can suggest ways to prioritize the steps needed to complete the first version of a workstation-based system. For further information, contact Patrice Janiga, (303) 498-2311. □

Missions continued from page 5

Multispectral Photographic System (AMPS) has six lenses, six 70-mm film magazines, and an assortment of optical filters. This is the same camera system, designed by ITEK Corp., flown aboard NASA's Skylab. ITEK engineers modified the AMPS camera mount to fit into MAG's aircraft and the system was used successfully with a variety of film emulsions and filter combinations over sites on the Tahoe National Forest.

9. California - Region 5 FPM requested MAG's support in acquiring color infrared aerial photos of 70 permanent plots and four other areas distributed across 13 national forests in California. The plots are used to assess pest activity and drought conditions within the state. □

Search continued from page 4

were entered into the LORAN system of a helicopter, enabling the helicopter to return to the exact spot. The "wing" turned out to be a snow-covered pile of logs, but the advantages of the system became evident. A second advantage is that the video tape can be reviewed after flying is stopped due to darkness or weather.

MAG was pleased to be able to assist in this effort. The Jackson County Sheriff has requested that the ATP staff return when the aircraft wreckage is found to acquire airborne video of the site. The Department believes video acquired after the wreckage is found may be useful as a training aid for search and rescue personnel. □

Events and Publications

Upcoming Events

Event	Date	Place	Contact
Airborne Video System Training	January 28-30, 1992	Fort Collins, CO	Dick Myhre (303) 498-1778
Pest Models Training	January 28-30, 1992	Wenatchee, WA (tentative)	Bov Eav (303) 498-1784
Fourth Biennial Forest Service Remote Sensing Applications Conference	April 6-10, 1992	Orlando, FL	Dick Myhre
INFORMS Workshop	April 7-9, 1992	Fort Collins, CO	Patrice Janiga (303) 498-2311
Spatial Analysis and FPM Workshop	April 27-30, 1992	Blacksburg, VA	Ross Pywell (303) 498-1705
ASPRS/ACSM/RT-92 Convention	August 3-7, 1992	Washington, DC	Bill White (303) 498-1777
RT-92	November 16-19, 1992	Taipei, Taiwan	Bill White

The following Prognosis training sessions and demonstrations are scheduled for various dates and locations. MAG highly recommends that anyone wanting to attend pest model training first attend a Prognosis training session.

Region 2 Training	December 16-20, 1991	Fort Collins, CO	Rich Teck (303) 498-1772
Region 9 Demonstration	January 6-7, 1992	Delaware, OH	Rich Teck
Region 1 Training	January 13-17, 1992 (full)	Kalispell, MT	Rich Teck
Region 1 Training	January 27-31, 1992	Helena, MT	Rich Teck
Region 3 Training	February 24-28, 1992	Marana, AZ	Rich Teck



Publications and Reports

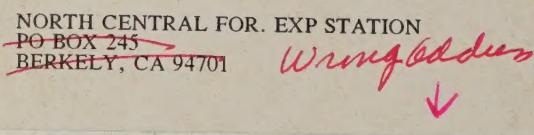
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Resource Analysis Systems. 1991. *Systems documentation for INFORMS-DG, version 1.0*. Resource Analysis Systems, 333 West Drake Road, Suite 240, Fort Collins, CO, 80526. □

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